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the scale can be adjusted with ease and precision by moving the tripod on its shelf. With the lens used in my apparatus, which is 8 cm. in diameter, the range of the latter adjustment is very great.

The galvanometer mirror used here is § inch in diameter. The lamp can be operated with either direct or alternating current, and the image is so bright that it has never been necessary to darken the room. The inexpensive lamp of the type used here is provided with a metallic hood, and with a pin hole and mica screen for adjusting the arc, which is controlled by hand. As used in this arrangement the edge of the hood is horizontal. While the round image of the carbon tip is sharp enough for all ordinary purposes, readings being taken to tenths of scale divisions, yet if it is desired to make one edge of the image straight and perfectly steady, this can be done simply by laying a bar of metal on the hood and moving it partly over the carbon until the adjustment is correct. By using a larger mirror on the galvanometer a more brilliant image could of course be obtained.

The arrangement described above has been in use here for over a year. During the preceding three years an automatic lamp with vertical carbons and an extra mirror were used instead of the hand regulated 90° lamp. The second arrangement has proved to be more satisfactory than the first. An automatic 90° lamp would of course be still more satisfactory.

S. J. BARNETT
THE TULANE UNIVERSITY OF LOUISIANA

THE AMPHIBIA OF THE MAZON CREEK SHALES

THERE have been but two species of Amphibia recognized from the shales which are exposed along Mazon Creek, Illinois. These two species are the remarkable reptile-like microsaurian *Amphibamus grandiceps* described in 1865 by Professor Cope and the salamander-like branchiosaurian described the past year by the writer under the name *Micrerpeton caudatum*. It is thus with considerable interest that the writer is able to announce the discovery of seven additional species distributed in six additional genera. This new and considerable addition to the knowledge of the Mazon Creek fauna is made possible through the courtesy of Drs. Schuchert and Eaton, of Yale University, who very kindly placed at the writer's disposal the entire collection of Mazon Creek Amphibia belonging to that institution.

The material is represented by ten specimens, including the most perfect example of *Amphibamus grandiceps* so far seen. This specimen makes possible the verification of the author's restoration of that form and the addition of the ischia. The other specimens are undescribed and represent a diverse fauna. An additional species of the family Amphibamidæ is represented by a well-preserved anterior half of a skeleton. Three additional branchiosaurian species are preserved. One of these species, represented by two specimens, is most remarkable for the preservation of the entire alimentary canal and a portion of the oviducts in both specimens. This on comparison with living Amphibia proves to show close resemblances to the alimentary canal of an immature branchiate individual of *Diemyctylus torosus* Eschscholtz from a freshwater pond on Orcas Island in Puget Sound. The other two species are remarkably like *Branchiosaurus* of Saxony, but differ in having an extremely elongate tail.

Perhaps the most interesting discovery in this new material is that of a primitive embolomerous amphibian of the order Temnospondylia. It is related to *Cricotus* and may be placed in the family Cricotidæ. It differs from *Cricotus,* however, in the form of the centrum and the relatively greater length of the component elements. The notochordal canal is widely open. A sixth species is founded on a fore limb which shows relationships to the family Molgophidæ, which has, so far, been known only from the Coal Measures of Linton, Ohio.

Our knowledge of the amphibian fauna of the Pennsylvanian up to the present time would indicate that the forms had already developed into local groups which had few connecting types. We may regard the new

member of the Molgophidæ as one of these connecting types. This localized specialization means that we must look into the Mississippian and the Devonian for the earliest of the Amphibia in North America, as the foot prints which have been discovered in these deposits would indicate.

The discovery of the new temnospondylous form with other facts of the distribution of the Temnospondylia indicates that the order originated in North America. At least the earliest known forms occur in this continent.

The amphibian fauna of Mazon Creek at the present time may be regarded as represented by nine species which are members of four orders and five families. The orders are: Branchiosauria, Microsauria and Temnospondylia. An additional fact of interest is the discovery of osseous branchial arches in an imperfectly preserved specimen; the second species from the Pennsylvanian in which these structures have been seen. This means the presence of a fourth order of Amphibia in the Mazon Creek shales.

ROY L. MOODIE
THE UNIVERSITY OF KANSAS,
January 14, 1910

A FIXING FLUID FOR PLANT TISSUES

MY experience with Bouin's fluid as a fixing material for certain plant tissues for cytological work has been so satisfactory that I take this opportunity of recommending it to plant cytologists as one which combines a number of admirable features. It has, of course, been used for a number of years in connection with animal tissues, and especially for studies of spermatogenesis, in which it gives notably clear preparations. I first tried it, along with a number of other solutions, for fixing anthers of *Œnothera,* in 1908. The formula used was as follows:

	Parts
Picric acid, saturated aqueous solution	75
Glacial acetic acid	5
Formaline	20

Of course, various modifications of this may be found advantageous for different plant forms.

The time of fixation must be short, otherwise maceration results. It should probably not exceed four to six hours. The time of washing must also be comparatively brief, as long washing causes deterioration and fragmentation of the material. *Œnothera* anthers, after a few hours' immersion in this fluid, frequently acquire a slight pinkish tint, which remains indefinitely after the material has been dehydrated and placed in 70 per cent. alcohol.

This solution seems to be a favorite one for studies on animal spermatogenesis, and I see no reason why it should not become popular also for various purposes in plant cytology. Its obvious advantages are (1) that, unlike osmic solutions, it leaves the tissues clear and transparent, (2) its penetration seems to be very rapid, giving an even and almost perfect fixation of the material, (3) it leaves the cytoplasm and nuclei perfectly colorless, giving particularly clear and brilliant results in staining chromatin and spindles when followed by Heidenhain's iron-hæmatoxylin stain.

R. R. GATES
MISSOURI BOTANICAL GARDEN

THE AMERICAN SOCIETY OF NATURALISTS

THE American Society of Naturalists met at the Harvard Medical School, Boston, Mass., on Wednesday, December 29, 1909. There were both morning and afternoon sessions. The program consisted of original papers and demonstrations of studies on evolution, and the meeting proved to be one of the most successful in the history of the society. The variety and importance of the papers read are well shown by the following list of titles:

PAPERS

U. Dahlgren: "Origin of the Electric Tissues in Teleost Fishes" (lantern).

D. T. MacDougal: "Origination of Parasitism in Higher Plants."

F. Boas: "The Influence of Heredity and of the Environment on Man."

E. Brainard: "The Evolution of New Forms in *Viola* through Hybridism."

R. R. Gates: "The Material Basis of Mendelian Phenomena" (lantern).

A. M. Lutz: "The Relation of Chromosome